DOCUMENT RESUME

ED 334 420 CE 058 471

AUTHOR Stasz, Cathy; Grubb, W. Norton
TITLE Integrating Academic and Vocational Education: Guidelines for Assessing a Fuzzy Reform.
INSTITUTION National Center for Research in Vocational Education, Berkeley, CA.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE Jul 91
CONTRACT V051A80004-91A
NOTE 23p.
AVAILABLE FROM NCRVE Materials Distribution Service, Horrabin Hall 46, Western Illinois University, Macomb, IL 61455 (order no. MDS-375: $1.00).
PUB TYPE Viewpoints (Opinion/Position Papers, Essays, etc.) (120)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Academic Education; Articulation (Education); Basic Skills; Case Studies; Communication Skills; Competency Based Education; *Educational Change; Educational Research; Federal Aid; Federal Legislation; Higher Education; *Integrated Curriculum; Outcomes of Education; Problem Solving; Secondary Education; Teamwork; Thinking Skills; *Vocational Education
IDENTIFIERS *Carl D Perkins Voc and Appl Techn Educ Act 1990

ABSTRACT

The 1990 amendments to the Carl D. Perkins Vocational Education Act of 1984 require the National Assessment of Vocational Education (NAVE) to evaluate integration of academic and vocational education. NAVE's study has three integration goals: (1) to examine the themes and research issues; (2) to identify data and data gaps; and (3) to address evaluation problems. Integration appears to raise enrollments in vocational education. Eight models have been identified, each with several variants. Integrated courses provide problem-solving, teamwork, communication, generic, and basic skills. Integration can change either a vocational or academic program. Research suggests that three elements are involved: vertical or horizontal alignment; pedagogy; and organizational structure. The integration movement has caught the interest of policymakers, educators, and academicians because they must articulate plans for integration in order to receive funds. Researchers will study secondary and postsecondary integration issues by using case studies and surveys to identify themes and supply data. Timing, consequences, and outcomes must be considered before determining the course of action. (One table and 14 references are included.) (NLA)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED334420

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

NCRVE
National Center for Research in Vocational Education
University of California, Berkeley

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY
P Seidman
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Working Paper

INTEGRATING ACADEMIC AND VOCATIONAL EDUCATION: GUIDELINES FOR ASSESSING A FUZZY REFORM

Cathy Stasz
RAND

W. Norton Grubb
University of California at Berkeley

National Center for Research in Vocational Education
University of California at Berkeley
1995 University Avenue, Suite 375
Berkeley, CA 94704

Supported by
The Office of Vocational and Adult Education,
U.S. Department of Education

July, 1991 **MDS-375**

BEST COPY AVAILABLE

This document is one in a continuing series of Working Papers. It has not been reviewed by NCRVE; therefore, this paper represents the views of its authors and not necessarily those of the Center or the U.S. Department of Education. NCRVE makes these Working Papers available upon request for informational purposes.

CE058471

FUNDING INFORMATION

Project Title:	National Center for Research in Vocational Education
Grant Number:	V051A80004-91A
Act under which Funds Administered:	Carl D. Perkins Vocational Education Act P. L. 98-524
Source of Grant:	Office of Vocational and Adult Education U.S. Department of Education Washington, D.C. 20202
Grantee:	The Regents of the University of California National Center for Research in Vocational Education 1995 University Avenue, Suite 375 Berkeley, CA 94704
Director:	Charles S. Benson
Percent of Total Grant Financed by Federal Money:	100%
Dollar Amount of Federal Funds for Grant:	$5,918,000

Disclaimer:

This publication was prepared pursuant to a grant with the Office of Vocational and Adult Education, U.S. Department of Education. Grantees undertaking such projects under government sponsorship are encouraged to express freely their judgement in professional and technical matters. Points of view of opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.

Discrimination:

Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance." Title IX of the Education Amendments of 1972 states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance." Therefore, the National Center for Research in Vocational Education project, like every program or activity receiving financial assistance from the U.S. Department of Education, must be operated in compliance with these laws.

May 1991
Prepared for the National Assessment of Vocational Education, U.S. Department of Education

INTEGRATING ACADEMIC AND VOCATIONAL EDUCATION:

GUIDELINES FOR ASSESSING A FUZZY REFORM

Cathy Stasz*
RAND
Santa Monica

W. Norton Grubb
School of Education
The University of California, Berkeley

The 1990 Amendments to the Carl D. Perkins Vocational Education Act of 1984 require the National Assessment of Vocational Education (NAVE) to evaluate "the extent and success of integration of academic and vocational education." While research efforts by the National Center for Research in Vocational Education (NCRVE)[1] and others (e.g., Adelman, 1989) reveal much about current efforts to integrate academic and vocational education, it is still a fledgling reform, fuzzy in its intentions and methods. Integration means different things to different people and reform efforts vary widely, from fairly simple course changes to efforts that effectively restructure the high school. NAVE's challenge, then, is to conduct a credible evaluation of the potpourri of reforms that call themselves "integration."

---

* The authors are both site directors of the National Center for Research in Vocational Education, the University of California, Berkeley. However, this paper represents their opinions only; it has not been reviewed either by the National Center or by RAND, and is not an official publication of either institution.

[1] See Grubb et al. (1991); Bodilly et al. (forthcoming); Beck (1991); Plihal (1990); and forthcoming work by Grubb and Kraskouskas on postsecondary forms of integration, Jerry Pepple on applied academics courses, George Copa and Robert Beck on the history and philosophy of integration, and June Schmidt on teacher training.

This paper, written to support NAVE's charter, has three goals:

- To examine the principle themes and research issues concerning the integration of academic and vocational education.
- To identify available data on integration and to suggest data gaps that NAVE research might fill.
- To address problems that NAVE's evaluation of integration might encounter.

This paper proceeds in four sections. First, we provide some background on the integration "movement" by examining why this reform has caught the interest of policymakers, educators and academics. We then discuss briefly what states and schools have been doing to integrate vocational and academic education, and we advance a more coherent definition of integration on which to base current and future research. Section two presents short- and long-term research questions for the NAVE agenda, and discusses both the availability of data and the data needs for answering these questions, in both secondary and postsecondary institutions. We also outline specific research studies that NAVE might carry out. The third section addresses problems that a national assessment might encounter. Finally we present conclusions and recommendations.

WHAT'S ALL THE FUSS ABOUT INTEGRATION?

Integration has captured the interest of educators, employers, and academics, each of whom sees it as a potential solution to specific problems. Critics of vocational education point to lowering enrollments that some interpret as the result of a narrow vocationalism — an emphasis on job-specific skills — that is no longer relevant to the new workplace. Lower enrollments also reflect increased academic requirements for high school graduation, since vocational courses are electives not required for graduation. For this group, integration can help in several ways. An infusion of academic content in vocational courses can increase their rigor enough for them to be counted as required courses, and can help prepare students more broadly for employment where requirements

are constantly changing. In Ohio, for example, new "applied math" courses are team-taught by vocational and academic teachers, and students receive mathematics credit. The introduction of applied math, applied communications, and other similar courses reduces time devoted to specific skill training that previously dominated the vocational program, and aims to provide students with a broader education.

Employers have claimed that new job entrants lack basic skills or need different skills — problem solving, teamwork, communication — to succeed in the high-tech workplace of the future. For this group, integrated courses would give vocational students more basic math than they would have otherwise, thus increasing basic skills. Applied communications and other integrated English courses frequently include a variety of communication skills, such as writing letters or dealing with clients and customers. The hope is that integration will move the curriculum in ways that advance these "generic" skills (Stasz, et al., 1990), as well as improving basic academic skills.

In the decade since "A Nation at Risk" castigated the public schools, parents, educators, and a flurry of reports have echoed employers' concerns about low basic skills and lack of "higher order thinking skills" (Resnick, 1987a). As a result, many school reformers seek to make academic learning more meaningful for all students and to prepare them better for the world of work. Although the term "integration" is not typically applied to reforms in academic education, new curriculum and theoretical approaches have the flavor of making academic instruction more vocational, or at least more applied. For example, Resnick's (1987b) analysis of how school learning differs from out-of-of school learning — in the workplace or throughout one's life — concludes that schooling should "encompass more of the features of successful out of school functioning," such as working in teams and using tools to solve real-life problems. Cognitive science researchers propose models of "cognitive apprenticeship" which draw heavily from studies of traditional vocational apprenticeship training (e.g., Lave, 1977) and

recommend "situating" learning in contexts that reflect how a skill will be used (e.g., Collins, Brown, and Newman, 1989).

With the advent of the 1990 Perkins Amendments, policymakers have joined the believers, by targeting integration as a major program improvement in vocational education that federal dollars will support. The Amendments require that every program supported by federal funds "integrate academic and vocational education in such programs through coherent sequences of courses so that students achieve both academic and occupational competencies" (Section 235). Federal legislation therefore provides both the resources for integration and the pressure to do so.

However, it is crucial to point out that the various supporters of integrating academic and vocational education — policy-makers, business representatives, reformers of vocational education, and critics of academic teaching — all have different reasons for adopting integration. As a result, integration is not a clear and unambiguous change, but instead is a fuzzy reform that comes in many guises. The most comprehensive survey of integration reforms to date (Grubb, et al., 1991) identifies eight different models, each with several variants,which serve many different goals. (These eight models are briefly described in Table 1.) As a result, integration can aim to improve either basic skills or "higher order thinking skills". It can aspire to change the vocational program, concentrating on vocational students, or it can reshape the academic program and encompass all students. It can result in changing the content of a single course, or restructure the way students learn in all courses.

The way reformers define their goals affects what they do and how they measure their success. For example, if the goal is to improve higher order thinking skills, the reform will probably focus on curriculum changes and measure student's inferential and problem-solving abilities. If the goal is to improve vocational students' job opportunities, the reform might reorganize vocational offerings in schools and forge better links to the business community, and then measure success in obtaining jobs. If the goal is to develop a broader version of vocational education, one less tied

Table 1

Models of Integrating Vocational and Academic Education

	Curriculum Changes	Teacher Changes	Students Targeted	Institutional Changes
1. Incorporating more academic content in vocational courses	Vocational courses include more academic content	Vocational teachers modify courses	Vocational students	None
2. Combining academic and vocational teachers to enhance academic content in vocational programs	Vocational programs include more academic content, in either vocational courses or related applied courses	Academic teachers cooperate with vocational teachers	Vocational students	None
3. Making academic courses more vocationally relevant	Academic courses include more vocational content; sometimes new courses (e.g., applied academics) adopted	Academic teachers (usually) modify courses, or adopt new ones	Potentially all students; in practice, vocational and general-track students	None
4. Curricular alignment: horizontal and vertical	Both academic and vocational courses modified, and coordinated across courses and/or over time	Academic and vocational teacher cooperate; numbers range from two to all	Potentially all students; actual targets vary	None necessary. Curriculum teams may foster cooperation.

	Curriculum Changes	Teacher Changes	Students Targeted	Institutional Changes
5. Senior projects	Seniors replace electives with a project; earlier courses may change in preparation	None necessary; teachers may develop new courses or modify content to better prepare students	All students	None necessary
6. The Academy model	Alignment among Academy courses (English, math, science, vocational) may take place	Academic and vocational teachers may collaborate on both curriculum and students	Usually potential drop-outs; sometimes students interested in specific occupational areas	School-with-a-school; block rostering; smaller classes; links to employers
7. Occupational high schools and magnet schools	Alignment among all courses may take place, emphasizing the occupational focus	All vocational and academic teachers assigned to an occupational school or magnet within a school; collaboration facilitated	Students interested in specific occupational areas	Creation of a self-contained occupational school or magnet school
8. Occupational clusters, "career paths," and majors	Coherent sequences of courses created; alignment may take place among courses within clusters	Teachers belong to occupational clusters rather than (or in addition to) conventional departments; collaboration facilitated	All students	Creation of occupational clusters; enhancement of career counseling; possible cluster activities

to specific job skills, then preparation for postsecondary education *or* employment might be the measure of success.

Research conducted to date suggests that the more ambitious attempts at integration include at least three elements. The first of these is curricular "alignment", which modifies both academic and vocational courses such that academic courses include more vocationally-relevant material and vocational courses more academic or basic content. In the most effective cases, academic and vocational teachers work together to achieve "horizontal" alignment — so that coordinated courses are offered at the same time. Vertical alignment involves a coherent sequence of vocational and academic courses over time, rather than (or in addition to) coordination across courses at the same time (Grubb, et al., 1991).

Ambitious reforms are also characterized by changes in pedagogy. In Ohio,for example, which has adopted "applied academics" curricula statewide, vocational and academic teachers often teach as a team. These curricula, as well as some popular off-the-shelf courses (e.g., Principles of Technology) feature an approach to learning math, physics, and communication skills that seems particularly suited to the learning needs of vocational students — one in which projects and lab activities are used more often to motivate learning, in which "academic" instruction is contextualized by its use in occupation settings, and in which both students and teachers are more active in their approach to learning.[2]

Finally, many schools attempting integration have changed their organizational structure in significant ways. Some have abandoned the traditional department structure in favor of broad occupational clusters encompassing a variety of related occupations (e.g., transportation, or health occupations) which house both vocational and academic teachers. Others, such as the "Academy" model, are organized as schools-within-a-school. Still others "block" classes to permit longer time periods for vocational labs.

---

[2] In the vocabulary developed in Grubb et al. (forthcoming), the pedagogical reforms in efforts at integration usually move from the conventional "skills and drills" methods common in the high school to very different methods we label "meaning-making".

While some states and schools have attempted ambitious reforms for integrating academic and vocational education, most have opted for fewer changes. By far, the most pervasive way to integrate involves the adoption of applied academics courses "off the shelf", especially Principles of Technology, Applied Math, and Applied Communication. Even so, this can involve a major effort on the part of teachers, particularly where they choose to develop their own curriculum materials or must extensively revise off-the-shelf materials. It is also important to see curriculum integration as a dynamic process, in which schools start with simple changes and then on to more complex reforms. In this vision, applied academics courses represent a reasonable first step toward broader reforms.

THE INTEGRATION DILEMMA

At this point, policymakers, practitioners and researchers (including NAVE) face a dilemma. State policymakers must articulate plans for integration in order to receive funds. On the one hand, this provides both the incentive to reform and the resources to do it. On the other hand, the law is not at all specific about what counts as integration, beyond mentioning "a coherent sequences of courses so that students achieve both academic and vocational competencies." The integration "mandate" is further confused by other requirements, which focus funding on special needs students.

Where integration has not yet been attempted, practitioners may be searching for models and approaches that comply with the legislation, yet that meet local needs and concerns. They often do this in an atmosphere where other local or state reforms may compete with their goals for integration. State graduation requirements, for example, may determine whether or not the applied academics course can be counted as English or math credits. Certification requirements may determine which teachers can teach new courses. In some states, state policy favoring job-specific skill training may collide with the intention in the Perkins Amendments to stimulate a broader form of vocational education.

In addition, the problem of implementing top-down reforms in an area of education that requires local, bottom-up solutions is another part of the dilemma. Integration is essentially a curriculum reform that requires changes in course content and pedagogy. Mandates cannot create the elements that promote innovation in schools — local vision, leadership, sustained support, financial and other resources.

The dilemma for researchers is how to evaluate current and planned efforts when integration remains a reform for many purposes, with multiple goals and different expected outcomes. Perhaps more importantly, how can the National Assessment keep sight of the *potential* results of integration, not just the simple models or narrow reforms that seem to dominate practice at the moment? These potential outcomes include increased basic skills, increased theoretical and applied learning for all students, and increased breadth of post-secondary opportunities. These potential benefits of integration will take a long time to emerge, certainly longer than the current NAVE charter.

RESEARCH ISSUES

Obviously, NAVE must first address its efforts to the short term question: What are institutions doing in response to the amended Perkins Act? In the following sections we propose a set of questions and a research strategy for addressing that issue in both secondary and postsecondary institutions. We also address general research issues and problems that affect the general NAVE agenda.

In addition to the short term question, NAVE studies should be sensitive to the long term questions: Can we articulate effective models of integration that can be emulated by schools? Is integration a good idea? Eventually, researchers and practitioners must address the effectiveness of integration reforms. In the meantime, research can help articulate ambitious models that can potentially reform education in several ways: by increasing basic skills and academic content; by improving academic teaching; by increasing collaboration among teachers and enhancing their

excitement about teaching and learning; by developing a more coherent curriculum; by preparing all students better for education and work; and by breaking down patterns of tracking and segregation.

Secondary School Integration Issues

At the secondary level, NAVE should be interested in two questions: What state policies govern integration? And what are schools now doing to integrate? At the state level, existing data from NCRVE research (e.g., Grubb et al., 1991; Bodilly, et al., forthcoming; McDonnell and Zellman, forthcoming) show wide variation in state policies and few ambitious reforms. Preliminary results from NCRVE's fifty-state survey, for example, show that many states have adopted the commercially available "applied academics" curriculum as the major vehicle for integration. This reform essentially changes what is taught in individual courses and typically only affects vocational students. Ohio has mandated applied academic courses in its vocational program, but most teachers are developing their own curriculum, and this is the only example of a statewide approach to integrating academic and vocationl education. The most ambitious models, including four-year vocational magnet schools and school-within-a-school models, are primarily the result of local reform efforts, not state initiatives.

Under current regulations, states must submit draft plans by June 1991. NAVE could extend current knowledge by conducting a survey of state policy that asks how integration is addressed in the plan, both currently and in projected activities. The major question to ask here is how ambitious the plan is in its attempts to integrate academic and vocational instruction. Does it opt for small changes or large ones? Does the plan include academic teachers and students, as well as those from the vocational side? Are there existing state policies or practices that hamper or limit integration —like graduation requirements that threaten vocational education enrollments, or teacher certification requirements, or course approval procedures that hamper the development of new courses? Does the plan restrict the conception of integration, or promote

certain approaches over others? And how is the state using technical assistance and other forms of consultation to help districts formulate their own approaches to integration?

With respect to how local schools respond to the integration "mandate", we know from current research that approaches are enormously varied. Even so, they often lack lack a clear definition of or purpose for integration. Even in states with clear policies — like Ohio — local implementation practices and the outcomes they produce differ. The only way to understand what schools are doing in response to the mandate of the Perkins Amendments, in our view, is to visit a large number of schools[3] — that is, to undertake some carefully -structured case studies of secondary schools.

Secondary School Case Studies

The case studies we envision should include districts with both comprehensive high schools and area vocational schools, as states vary in where and how secondary vocational education is provided. The sample can either be random or purposive, but in any case it should include some states and districts where interesting efforts are known to be taking place. In addition, because the Perkins Amendments direct federal aid to districts with high concentrations of "special needs" students, the sample should include sufficient numbers of such districts — including large urban school districts dominated by low-income and minority students — to see what fom integration has taken. Intensive visits over several days are necessary to interview the key actors — principals, teachers, students — and visit classrooms.

Interviews and classroom observations should focus on answering several questions: What is the goal of integration in this school or district? What model is being implemented to reach that goal? What are the implementation plans or problems? What kinds of changes will integration mean for students, teachers, academic instruction, or guidance and counseling? What long- and short-term

[3] In our research for NCRVE, we found it impossible to rely on written or oral descriptions of what schools are doing; for more information on these efforts, see Grubb et al., 1991, and Bodilly et al, forthcoming. Even brief site visits may fail to reveal the real intentions and effects of complex reforms.

changes are expected? How will the effort be evaluated to determine if interim and long term objectives are met?

This case study of about 30 locations should be essentially descriptive, not evaluative. Below, we discuss several reasons why outcome evaluations would be premature, as well as methodologically unsound, in the context of the National Assessment.

Postsecondary Integration Issues

At the postsecondary level, NAVE will also be interested in state policies that affect integration and in institutional responses to integration as a means of program improvement. Much less is currently known about about state policy and local implementation of integration reforms at the postsecondary level, partly because integration has been a much less urgent reform at this level. (Indeed, while the requirement in the Perkins Amendments to integrate programs funded by federal resources extends to postsecondary institutions, this looks like a secondary reform that only by chance applies to postsecondary education.) Preliminary results from an NCRVE survey of about 300 community colleges and technical institutes (Grubb and Kraskouskas, forthcoming) indicates that the dominate form of integration consists of requiring vocational students to take general education classes. A few institutions are developing new curricula, such as vocational or technical mathematics and technical writing, and others are using Writing Across the Curriculum and Reading Across the Curriculum to change the content of vocational as well as academic courses. About one-fourth of those surveyed seemed to be on the road to more ambitious reform, and were, for example, designing new interdisciplinary courses. With only spotty data currently available, NAVE should consider a survey of states to determine current policies for integration and methods for interpreting or enforcing the integration requirement.

Postsecondary Survey

We suggest a survey of a random sample of about twenty states that devote a relatively high percentage of their Perkins funds to postsecondary education. (Some states provide so little aid to postsecondary institutions that it would be foolish to expect these resources to have any effect.) Within these states, locations with a mixture of community colleges, AVTS's, and technical institutes should be sampled. Rather than an intensive case study, we envision a lower level of effort, precisely because there seems to be less ferment at the postsecondary level. The survey of local practices in response to the Perkins Amendments could be conducted over the telephone, with selected site visits to locations which show some activity in the area of integrated programs.

The questions of interest overlap those aimed at secondary schools, but at a different level of detail. That is, the focus should be be more on the state and institutional level, rather than on classrooms and teaching practices. Of particular interest here are the arguments and rationale offered for integration at the postsecondary level. In secondary schools, integration has been primarily a curriculum reform, justified by the need to better prepare students for work or postsecondary training and education opportunities. At the postsecondary level this argument may still be valid; for example, a recent analysis of health care technicians found that hospitals were satisfied with the technical qualifications of recent graduates but unhappy with their communications skills, suggesting that the incorporation of more academic content in health tech programs would improve training.(Hudis et al., 1991). In addition, curriculum integration at the postsecondary level has the potential to join together parts of the community college that have been separated — the academic and the vocational sides, the vocational mission and the remedial role. However, there is much less clarity about what the purposes of integration are at the postsecondary level, and the issue of whether integration is desireable — or whether postsecondary programs should be quite specialized — should remain an open question.

GENERAL RESEARCH ISSUES

NAVE must consider several general research issues before determining a course of action. The first is the problem of timing. The initial year under the Perkins Amendments is 1991-92. We anticipate that states and localities will spend a great deal of this year in initial planning and start-up activities; then implementation of new programs may not occur until the 1992-93 school year. The earliest we might expect to see changes is in 1993-94. Indeed, with a dynamic process, reform might reasionably take five or six years: year 1 would be involved in planning, year 2 would begin the process of change with the ninth grade, years 3 through 5 would complete the proces of reform (assumining no special barriers or attempts to reformulate the change) — so that year 6 would be the first year when a complete reform might be in place. However, NAVE must make its report to Congress in July 1994. Given this timeline, the evaluation should first consider what kinds of changes might be expected within this time frame, rather than prematurely deciding that some efforts have failed. The focus might be on defining interim outcomes (e.g. replacing general science courses with applied academics) or future plans, rather than on "hard" student outcomes.

Evaluating the consequences of integration also poses some technical problems. Programs being implemented under the banner of integration vary widely in their purposes, scope, and stage of development. This situation makes it difficult to identify appropriate control or comparison groups, or to define comparable formative or summative outcome measures. Formal evaluations may not be warranted, given their high cost, the uncertainty about how to measure outcomes, the lack of control groups, and the timing problem: very few programs will be far enough along to expect any substantial outcomes by the time Congress reconsiders the Carl Perkins Act.

Given the importance of understanding the outcomes of integration, it is important to consider a variety of other options. NAVE might conduct several focused evaluations. Ohio, for example,

has developed an applied academics curriculum that is being used in many schools and has been mandated for use in all vocational programs. This creates a natural experiment where sites with and without this curriculum — in various stages of implementation — can be compared. (For example, ongoing NCRVE research in Ohio suggests that larger schools have more resources and more flexibility in implementing the changes associated with applied academics than do smaller schools.)

A second target for focused evaluation is the off-the-shelf applied academics curricula developed by CORD/AIT that serves as a main vehicle for integration in many states. An independent evaluation might examine the variations in implementing these courses, the teaching practices or other changes they affect, and how they serve local implementation goals. Ongoing NCRVE research indicates that vocational teachers often reject these materials as too "generic" or spend a considerable amount of time adapting them to be more applied to a particular occupational area.

Third, longitudinal study of some long-standing programs might be considered. Some exemplary schools, identified in NCRVE work and other studies, are graduating students from integrated programs. These students could be followed up to examine their postsecondary options and choices and how integration impacted them.

Finally, a synthesis of existing evaluations might shed light on student outcomes. Two applicable studies are David Stern's research on the California Peninsula Academies (Stern et al., 1988, 1989) and Robert Crain's NCRVE study of magnet schools in New York. Although previous research is not without its flaws, it provides a starting place for synthesizing what is known.

CONCLUSIONS

In our review of current efforts to integrate academic and vocational education — based primarily on ongoing research by NCRVE — we draw several conclusions. First, while integration embraces a varied range of reforms, most schools have so far opted

for minor course-level changes. The education community needs to develop a clearer vision of what integration can potentially accomplish. This definition of integration would include at least three elements: vertical or horizontal alignment of courses; changes in pedagogy; and changes in organization (e.g., collaboration between academic and vocational teachers). Research should identify models that can be emulated by local institutions, based on local goals and needs. Single approaches or mandates will not suffice.

From NCRVE research and other sources, available baseline data (both case studies and surveys) describe various models of integration and current state policy at the secondary level. Much less information is available at the postsecondary level, but some studies are underway that can be built upon. New data collection at both levels is feasible, and we outlined studies for each level. Research should focus on current and future planning and implementation, since it is too early to expect much in the way of student outcomes. There are, however, some opportunities for evaluating ongoing programs more formally and for synthesis of recent and current evaluation research.

We identify several problems that may hamper attempts to evaluate the success of integration. First, there is a timing problem. New programs won't be in place before 1992; changes can't be expected until 1993, if then. Technical problems arise in defining feasible comparison or control groups and outcome measures, especially when programs are so varied in practice. Finally, conceptual problems arise in addressing the longer term question of whether integration is a good idea. While current conceptions of integration may make sense at the secondary level, other conceptions — still to be articulated — may apply to postsecondary integration reforms.

REFERENCES

Adelman, N. E. (1989, February). *The case for integrating academic and vocational education.* Washington, DC: Policy Studies Associates, Inc. for the National Assessment of Vocational Education, U.S. Department of Education.

Beck, R. (1991, February). *General education: Vocational and academic collaboration.* National Center for Research in Vocational Education, The University of California, Berkeley.

Bodilly, S., Stasz, C., and Ramsey, K. (forthcoming). *Policy for integrating academic and vocational education.* Santa Monica: RAND and the National Center for Research in Vocational Education, The University of California, Berkeley.

Collins, A., Brown, J.S., and Newman, S. (1989). Cognitive appentivceship: Teaching the craft of reading, writing, and mathematics. In L. Resnick (ed.), *Knowling, learning, and instruction: Essays in honor of Robert Glaser* (Hillsdale N.J.: Lawrence Erlbaum.

Grubb, W.N., Davis, G., Lum, J., Plihal, J, and Morgaine, C. (1991). *"The Cunning hand, the cultured mind": Models for integrating vocational and academic education.* National Center for Research in Vocational Education, The University of California, Berkeley.

* Grubb, W.N., Kalman, J., Castellano, M., Brown, C., and Bradby, D. (forthcoming). *Coordination, effectiveness, pedagogy, and purpose: The role of remediation in vocational education and job training programs.* National Center for Research in Vocational Education, The University of California, Berkeley.

McDonnell, L., and Zellman, G. (forthcoming). *Education and trainig for work in the fifty states: An overview of major federal and state policies.* Santa Monica: RAND and the National Center for Research in Vocational Education, The University of California, Berkeley.

Lave, J. (1977). Cognitive consequences of traditional apprenticeship training in West Africa. *Anthropology and Education Quarterly* 8:177-180.

* This document is now titled "Readin', Writin', and 'Rithmetic One More Time: The Role of Remediation in Vocational Education and Job Training Programs." It is MDS-309.

Plihal, J. (1990, March). Integration of vocational and academic education: Theoretical and actual approaches. University of Minnesota, Department of Vocational and Technical Education. Forthcoming, National Center for Research in Vocational Education, University of California, Berkeley.

Resnick, L. (1987a). *Education and learning to think.* Washington D.C.: National Academy Press.

Resnick, L. B. (1987b, December). Learning in school and out. *Educational Researcher*, 19 (9), 13-20.

Stasz, C., McArthur, D., Lewis, M, and Ramsey, K. (1990). *Teaching and Learning Generic Skills for the Workplace.* Santa Monica: The RAND Corporation and the National Center for Research in Vocational Education, Report R-4004-NCRVE/UCB.

Stern, D., Dayton, C., Paik, I., Weisberg, A., and Evans, J. (1988, Summer). Combining academic and vocational courses in an integrated program to reduce high school dropout rates: Second-year results from replications of the California Peninsula Academies. *Educational Evaluation and Policy Analysis*, 10 (2), 161-170.

Stern, D., Dayton, C., Paik, I., and Weisberg, A. (1989, Winter). Benefits and costs of dropout prevention in a high school program combining academic and vocational education: Third-year results from replications of the California Peninsula Academies. *Educational Evaluation and Policy Analysis*, 11 (4), 405-416.